

- 1           1.    A system for automatically producing an  
2   embroidery design, the system comprising:
- 3           a)    means for inputting an embroidery pattern  
4                into an image data file, the image data file  
5                comprising a plurality of pixels, each pixel  
6                comprising a bitmap representing a color;
- 7           b)    processing means operatively connected to  
8                said inputting means for storing said image  
9                data file; and
- 10          c)    an embroidery data generating mechanism  
11                operatively connected to said processing  
12                means for generating a complex embroidery  
13                pattern directly from a scanned, color image.



1           3. The system of claim 1, further comprising  
2 line-fitting means for line-fitting each object,  
3 wherein an object comprises an outer contour, a  
4 predetermined number of inner contours, and a skeleton  
5 contour, said line-fitting means comprising a gallus-  
6 neurath triangular filter.

1           4. The system of claim 3 further comprising  
2 stitch angle determination means for determining a  
3 stitch angle that produces a minimal plurality of  
4 fragments.

1           5. The system of claim 4, further comprising  
2 generate path means for determining an optimal order  
3 for the plurality of fragments to be sewn.

1           6. The system of claim 1, further comprising  
2 labelling means for labelling a plurality of points on  
3 the skeleton and edge contours.

1           7. The system of claim 6, further comprising  
2 merging means for merging a series of points from the  
3 plurality of points on the skeleton contour.



1           12. A method for automatically producing an  
2           embroidery design, the method comprising the steps of:

3           a)   inputting an embroidery pattern into an image  
4           data file, the image data file comprising a  
5           plurality of pixels, each pixel comprising a  
6           bitmap representing a color;

7           b)   classifying and line-fitting each object in  
8           said bitmap as a thin object or a thick  
9           object, each of said objects comprising an  
10          outer contour, any number of inner contours,  
11          and a skeleton contour;

12          c)   computing an optimum sew order; and

13          d)   generating an image output file.

1           13. The method of claim 12, further comprising  
2           the step of generating the plurality of fragments.

1           14. The method of claim 13, further comprising  
2           the step of determining an optimal order for the  
3           plurality of fragments to be sewn.

1           15. The method of claim 14, further comprising  
 2 the step of merging a series of points from the  
 3 plurality of points on the skeleton contour.

1           16. The method of claim 15, further comprising  
 2 the step of extracting at least one column.

1           17. The method of claim 16, wherein said step (b)  
 2 of classifying each pixel within the image data file  
 3 comprises the step of associating each connected pixel  
 4 having a similar color with a unique object identity.

1           18. The method of claim 17, wherein said step (b)  
 2 of classifying additionally comprises the step of  
 3 traversing a plurality of chain codes associated with  
 4 one of the group of skeleton contour, inner contour(s),  
 5 and outer contour.

1           19. The method of claim 14, wherein said step of  
 2 determining an optimal order for the plurality of  
 3 fragments to be sewn comprises the step of identifying  
 4 a point and recursively identifying a plurality of  
 5 fragments touching said point.

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- 1           20. A method for automatically producing an
- 1       embroidery design, the method comprising the steps of:
  
- 2           a)     inputting an embroidery pattern into an image
- 3                   data file, the image data file comprising a
- 4                   plurality of pixels, each pixel comprising a
- 5                   bitmap representing a color;
  
- 6           b)     locating a set of regular and singular
- 7                   regions disposed in said image data file;
  
- 8           c)     interpreting said set of regular and singular
- 9                   regions;
  
- 10          d)     computing an optimum sew order; and
  
- 11          e)     generating an image output file dependent on
- 12                   said interpreted set of regular and singular
- 13                   regions.